



# BLOCKCHAIN IN FINANCIAL SERVICES

Competitor Leaderboard

Prepared for Oracle



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## 1.1 Why Read This Report?

This document details several vendors active in the blockchain in financial services space, specifically those offering blockchain solutions for identity verification, cross-border payments and insurance. This report is not intended to provide comprehensive coverage of all the vendors operating in this market, but introduces the reader to 15 blockchain vendors that Juniper Research considers key players in the market.

Juniper Research is a Europe-based provider of business intelligence. We specialise in providing high-quality data and fully researched analysis to manufacturers, financiers, developers and service/content providers across the communications sector. Juniper Research is fully independent and able to provide unbiased and reliable assessments of markets, technologies and industry players. Our team is drawn from experienced senior managers with proven track records in each of their specialist fields.

## Blockchain in Financial Services: Key Takeaways

### Increased Global Interest in Blockchain Technology

In recent years, there has been a significant increase in investment and patent filing activity for blockchain-related technologies from stakeholders in the financial services space; Deutsche Bank, UBS, Bank of NY Mellon, USAA and Infosys have been exploring blockchain technology for a number of years. In 2020, more than 8,000 blockchain patents were filed.

### Benefits of Blockchain for Financial Service Processes

Blockchain deployment represents a significant shift away from the data silo approach, common to many areas of financial services. The technology offers advantages in terms of its ability to reduce the number of intermediaries required to complete a transaction; helping simplify processes, and increase speed and security, as well as reducing costs. Blockchain can also act to reduce the potential for abuse of trust, with each process within a blockchain being transparent, independently verifiable and auditable in real-time by each participant; helping meet requirements for regulatory compliance.

### Barriers to Blockchain Deployment in Financial Services Are Significant

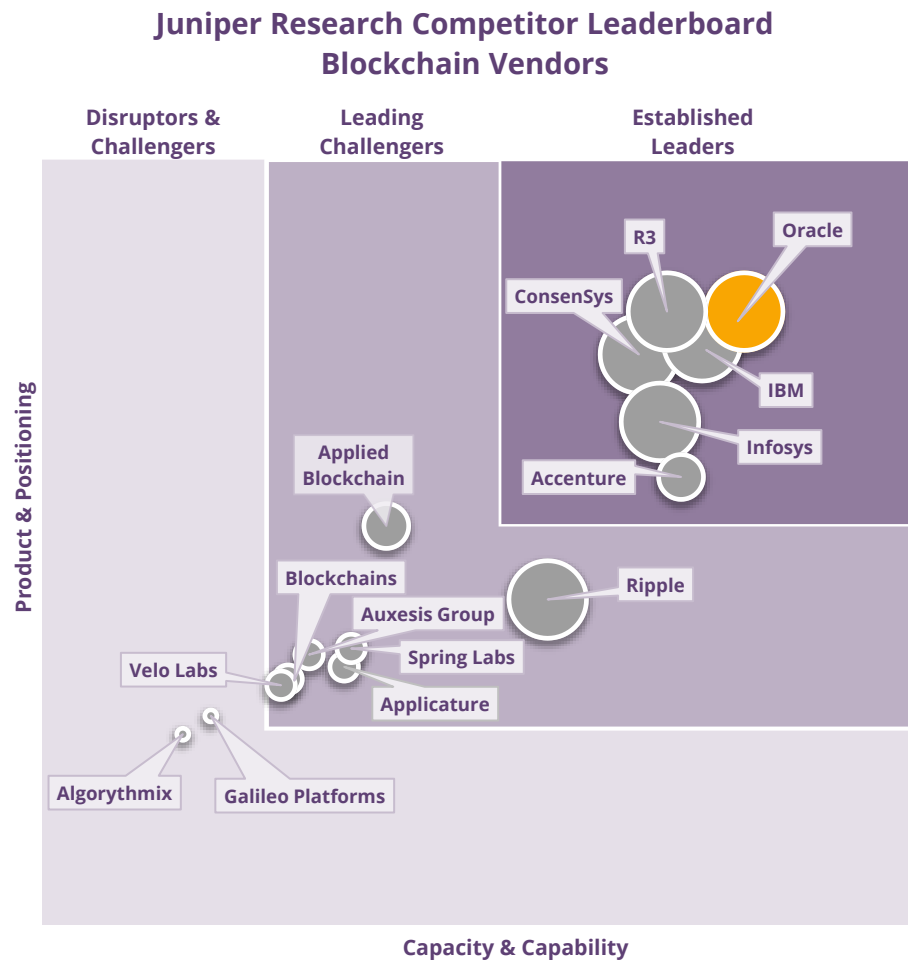
Blockchain technology faces similar data challenges to other technologies still in their early stages. However, the barriers to broader blockchain adoption both within the sphere of financial services and beyond are not only technological in nature, but also relate to business processes, financial considerations and regulatory issues. Each of these issues is heavily interwoven with the others.

### Blockchain Is Not a Panacea

There is no 'one-size-fits-all' blockchain system; different use cases call for different approaches, depending on the use case requirements of the system. It is also important to note that blockchain should not be considered a panacea for all the challenges faced by financial service businesses – whether blockchain reaches mainstream adoption in this area remains to be seen. However, regardless of use cases, blockchain holds considerable promise for enabling companies to work together in a way that was simply not possible before across an increasing number of use cases.



Figure 1: Juniper Research Competitor Leaderboard – Blockchain in Financial Services



Source: Juniper Research

# ORACLE®

Oracle, founded in 1977 as Software Development Laboratories, is a world leader in cloud computing services. Oracle has recently become a convincing leader within the blockchain space, investing heavily in research and development.

Oracle continues to innovate in the provision of blockchain services, including the launch of Blockchain Table; improving its offering and making it a go-to enterprise blockchain provider for an increasing number of businesses. Oracle has leveraged the growing opportunities within the financial services space and has seen in recent years increased deployment, with a number of PoCs (Proofs of Concept) in advanced pilot or full production.

Oracle now has the opportunity to capitalise its successes, as well as its strong reputation as a market leader, to further refine and develop its enterprise blockchain offering to attract new business and expand existing partnerships.



### 1.1.1 Oracle



Table 2: Juniper Research Competitor Leaderboard Heatmap: Oracle

	Capability & Capacity					Product & Position					Market Presence
	Scale of R&D Activity	Customers & Deployments	Size of Operations	Marketing	Experience in Sector	Blockchain Product Portfolio	Technology Assessment	Technology Partnerships	Creativity & Innovation	Future Business Prospects	
Oracle											



Source: Juniper Research

#### i. Corporate

Oracle was founded in 1977, and was one of the early drivers of the market for relational database management systems. The Oracle database has subsequently become one of the market-leading systems in the enterprise area. Oracle’s blockchain platform was announced in 2017, released in Beta at the beginning of 2018 and has been generally available from July of 2018.

As part of its Oracle Blockchain Platform, the company has created significant enhancements around Hyperledger Fabric; creating an advanced cloud PaaS offering, an on-premises Blockchain Platform version, Blockchain App Builder, for low-code smart contract creation, as well as the addition of tokenisation support. Oracle was the first mainstream database vendor to introduce crypto-secure data management in a general-purpose database, with the introduction of Blockchain Tables.

At present, Oracle has 132,000 employees worldwide. Key executives include Safra Catz (CEO); Larry Ellison (CTO); Frank Xiong, Group VP, Blockchain Product Development.

#### ii. Geographical Spread

Oracle operates from offices in more than 145 countries worldwide. Its headquarters are in California, US. The company has 29 data centres across Asia Pacific, West Europe, North America and South America. Oracle’s blockchain solutions are available and used worldwide.

#### iii. Key Clients & Strategic Partnerships

Since the launch of its platform in 2018, Oracle has secured a number of customers and partnerships:



- Since 2019, AJJB (Arab Jordan Investment Bank) has been using Oracle Blockchain Platform to facilitate real-time cross-border money transfers.
- Eastnets uses Oracle Blockchain Platform for secure near real-time automated watchlist/sanctions updates traceability for over 30 financial institutions.
- Ahli Jordan Bank's AnaMeen Digital Identity mobile app offering eKYC as a service is using Oracle's platform. The Bank has reduced the time taken for identity verification from 10 days to minutes, and has been able to demonstrate an audit trail to ensure compliance with both Jordanian and global regulations.
- eMcRey uses Oracle's platform to help streamline the merchant onboarding process, reducing errors and processing time through its Apex Decentralized Onboarding, which synchronizes data between all the parties involved – acquiring banks, network service providers and POS hardware providers.
- Standard Chartered built Securities Services Blockchain on Oracle's platform for asset tokenisation, digital trading, and real-time 24/7 settlement.
- With Deloitte, jointly creating an Oracle Blockchain-based solution for cross-ERP/GL Intercompany transaction and invoice reconciliation to streamline the process and provide cross-LE visibility using shared accounting ledger, to reduce risk of ageing debt, and help improve regulatory compliance at lower cost.
- Oracle also works with Reply Blockchain in the area of parametric insurance; enabling the creation of smart contracts for handling instant policies within travel insurance, as well as with Supermoney on its Securus insurance back-office payment and reconciliation offering.
- With Pravici, the partnership offers Oracle Loyalty Cloud users the ability to extend their system to multi-brand loyalty network using Oracle Blockchain Platform. Oracle also supports the Global Loyalty Network, to enable bank-anchored global integrated platform that offers cross-border use of loyalty points and benefits around the world to card users.
- With TWIDEX and TicketCoin, who use Oracle Blockchain Platform tokenization capabilities to offer the NFT platform for data-driven engineering, pricing &

exchange of Virtual Assets that aims to allow companies to capitalize their monetizable data and KPIs.

Other deployments span several verticals such as healthcare, transportation and logistics, and supply chains, as well as growing consortiums, such as Global Shipping Business Network. This was created by a number of carriers and port operators to improve visibility and tracking of container cargo and transform the maritime shipping industry.

Across Oracle's blockchain projects, about a third to a half of customers are beyond the PoC stage and are in advanced pilots or full production.

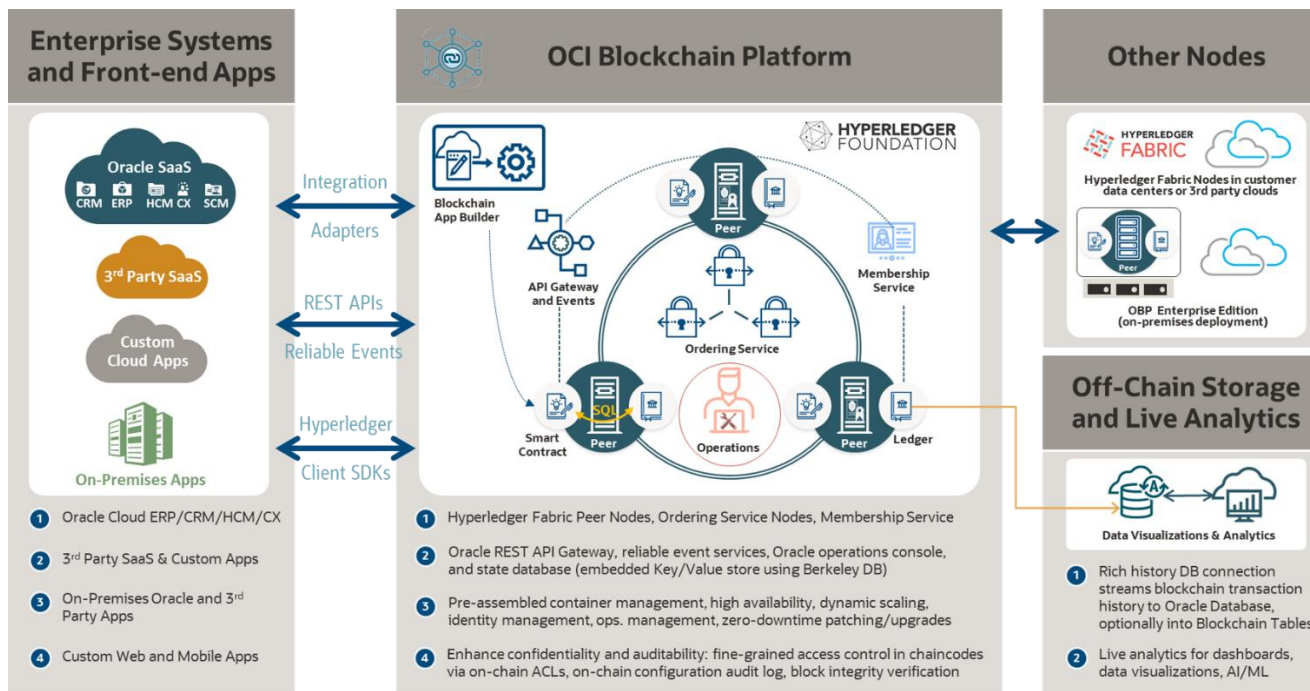
#### iv. High-level View of Offerings

##### a) Oracle Blockchain Platform

The Oracle Blockchain Platform is a fully managed enterprise blockchain solution. It offers a permissioned blockchain with managed cloud Platform-as-a-Service, as well as on-premises, hybrid, or multi-cloud deployments. The platform allows organisations to easily build blockchain networks to drive more secure and efficient transactions across enterprise ecosystems. The platform is built on top of Hyperledger Fabric and includes an extensive set of operations and development tools, as well as integration accelerators; allowing enterprise applications to easily conduct cross-system transactions and leverage partner data posted in the distributed ledger.



Figure 3: OCI (Oracle Cloud Infrastructure) Blockchain Platform



Source: Oracle

The platform's transaction performance has been benchmarked in excess of 2,000 TPS in a real-world customer scenario.

b) Key features

Enterprise ready: Offering highly secure, built-in privacy, scalable business networks, highly resilient, built-in replication and recoverability, HA+DR and flexible, hybrid and multicloud deployments, with tokenization engine for FT and NFT applications.

Facilitates rapid integration: With REST APIs for API-driven integration, plug-n-play enterprise adapters, blockchain events subscription with reliable callback delivery, and embedded 2PC-based atomic update orchestration across blockchains

Offers quick time to value: A pre-assembled, managed PaaS (Platform-as-a-Service) Cloud offering, dynamic configurability and member onboarding, as well as low-code dev/test support to auto-generate and deploy application smart contracts within minutes.

Extends the boundaries of enterprise apps: providing business-ready solutions and extending ERP/GL/SCM business processes in Oracle SaaS and on-premises, as well as non-Oracle applications; enabling data sharing and ensuring trustworthy transactions across siloed systems and participants.

To ensure security and data integrity within a permissioned blockchain network with enrolled members, all organisations use X.509 certificates for their identity and exchange digitally signed messages over TLS-encrypted links. In case a certificate has been compromised, OBP provides certificate revocation management and distributes CRLs across the network.

More recently, Oracle Database blockchain tables were introduced: this new type of insert-only table restricts deletions, updates, and other changes, and cryptographically chains rows with hashes to provide higher tamper resistance that can enable the use of immutable ledgers right in the Oracle database.





Oracle also offers a SaaS blockchain application in supply chain management – Intelligent Track & Trace. Oracle's platform has been used by more than 250 customers across a number of use cases. Within banking and financial services, these include payments and securities services, CBDC, trade finance, business and consumer banking, smart insurance, intercompany reconciliation, and invoice reconciliation and settlement. Platform deployment also extends beyond the financial sphere to other use cases including government/public services, retail, manufacturing, transportation/logistics, automotive, education, and healthcare/pharmaceuticals.





Table 4: Juniper Research Competitor Leaderboard Scoring Criteria

Category	Factor	Description
Capability & Capacity	Scale of R&D Activity	The scale of a company's R&D activities in the blockchain field, as measured by the number of designers and developers working in the space and funding allocated to R&D activity.
	Customers & Deployments	Based on the number and scale of reported trials and commercial deployments, weighted in favour of deployments beyond the PoC stage.
	Size of Operations	Assessment of the number of markets in which the vendor operates.
	Marketing	The strength of the vendor's brand and marketing capability of its blockchain, as perceived by a review of the company's website and an analysis of its relative popularity, together with a comparative analysis of brand media coverage.
	Experience in Sector	Based on the length of time a company and its key developers have been engaged in blockchain-related activities.
Product & Position	Blockchain Product Portfolio	Breadth and depth of a company's product range in the area, including the range of verticals addressed by solution.
	Technology Assessment	The extent to which the company has developed its own blockchain network technology. Does it offer test networks? What volume of transactions does the technology permit?
	Technology Partnerships	The extent to which vendors have agreed deals with key technology partners, consortia and alliances, enabling them to gain ready access to third-party solutions and/or leverage partner technology capabilities.
	Creativity & Innovation	How is the player differentiating itself from the field? Has it innovated in its use of blockchain technology?
	Future Business Prospects	An analysis of the longer-term prospects for the company, based on the likely impact on its target verticals.
Market Presence	Market Presence	Size of blockchain operations in the financial services sector, including global reach and volume and value of business.

Source: Juniper Research



## 1.2 Juniper Research Competitor Leaderboard Assessment Methodology

Juniper Research provides updates on a selected number of blockchain providers. To qualify for the Leaderboard, companies must be involved in the direct provision of blockchain solutions within the financial services sphere. The companies included here have developed specific expertise in the space, though some embarked on the route earlier than others and therefore have wider customer bases or geographical reach. It includes established specialists, such as R3 and ConsenSys, through to companies whose provision of blockchain solutions is part of a wider offering, such as Oracle and IBM. This research covers a significant number of vendors; however, we cannot guarantee that all players in the market are included. Our approach is to use a standard template to summarise the capability of players offering blockchain in financial services. This template concludes with our view of the key strengths and strategic development opportunities for each vendor. We also provide our view of vendor positioning using our Juniper Research Leaderboard technique. This technique, which applies quantitative scoring to qualitative information, enables us to assess each player's capability and capacity, as well as its product and position in the broader market for blockchain in financial services. The resulting Competitor Leaderboard exhibits our view of relative vendor positioning.

We have assessed each vendor's capabilities against the criteria in Table 4.

### 1.2.1 Limitations & Interpretations

Our assessment is based on a combination of quantitative measures where they are available (such as revenues and numbers of employees) that will indicate relative strength as well as of qualitative judgement based on available market and vendor information as published and gleaned during our extensive set of one-to-one CxO-level interviews right across the market. We have used publicly available information to arrive at a broad, indicative positioning of vendors in this market, on a 'reasonable efforts' basis. However, we would also caution that our analysis is almost by nature based on incomplete information and therefore for some elements of this analysis we have had to be more judgemental than others. For example, with some

vendors, less detailed financial information is typically available if they are not publicly listed companies, although we have detailed data on the scale of VC investment.

We also remind readers that the list of vendors considered is not exhaustive for the entire market but rather selective. Juniper Research endeavours to provide accurate information. Whilst information or comment is believed to be correct at the time of publication, Juniper Research cannot accept any responsibility for its completeness or accuracy; the analysis is presented on a 'reasonable efforts' basis.

The Juniper Research Competitor Leaderboard above compares the positioning of blockchain vendors based on Juniper Research's scoring of each company against the above criteria that Juniper Research has defined. The Leaderboard is designed to compare how the vendors position themselves in the market based on these criteria; relative placement in one particular unit of the Leaderboard does not imply that any one vendor is necessarily better placed than others. For example, one vendor's objectives will be different from the next and the vendor may be very successfully fulfilling them without being placed in the top right box of the Leaderboard, which is the traditional location for the leading players.

Therefore, for avoidance of doubt in interpreting the Juniper Research Competitor Leaderboard, we are not suggesting that any single cell implies in any way that a group of vendors is more advantageously positioned than another group, just differently positioned. We additionally would draw the reader's attention to the fact that vendors are listed alphabetically in a unit of the Leaderboard and not ranked in any way in the cell in question.

The Leaderboard is also valid at a point in time: November 2021. It does not indicate how we expect positioning to change in future, or indeed in which direction we believe that the vendors are moving. We caution against companies taking any decisions based on this analysis; it is merely intended as an analytical summary by Juniper as an independent third party.

Finally, we would point out that the Leaderboard is based on a global view consolidated across the blockchain space; any Leaderboard produced for one specific region or segment would by definition show different vendor positioning. Indeed, not every vendor would appear on such a Leaderboard.



### 1.3 Question & Answer with Oracle



*Juniper Research interviewed Mark Rakhmievich, Senior Director, Blockchain Product Management in August 2022.*

#### 1.3.1 What are the key success factors in enterprise blockchain projects?

Enterprise blockchain projects are typically based on use cases where distributed ledger enables real-time, trusted exchange of information and transactions between business units, legal entities, or separate companies. The success of these projects depends on a well-defined use case that provides clear benefits to the participants so that they are willing to collaborate. The business benefits or other incentives must outweigh the burdens of having to agree on data to share, governance principles, and sharing implementation costs. Business and legal arrangements can vary widely. In some cases, the founding member organizations in enterprise blockchain might belong to a single company, but still benefit from independent control of decentralized processes as separate business units. In other cases, founding member(s) may absorb infrastructure costs because the savings or incremental revenue opportunities the use case generates are much greater, or they may charge participation fees to other members to offset the infrastructure costs.

Other factors include using a comprehensive enterprise blockchain platform that minimizes the infrastructure and operating burdens or barriers, supports confidentiality and privacy requirements, and provides an easy means to onboard ecosystem participants – internal or external, such as pre-assembled cloud BaaS, identity management, and related features. And I would add, having low-code development tooling, like Oracle's Blockchain App Builder, that can allow auto-generation of smart contract chaincodes from templates and specifications is

very important. It minimizes the time and effort from use case design to testing, allowing multiple variations to be quickly explored and promising ones further developed for production deployments. Companies generally want to see something working and providing initial benefits within a few months, not years.

#### 1.3.2 What value can blockchain add in financial services, when deployed correctly?

There are many areas in financial services where blockchain can add value – whenever there's information asymmetry between organizations, blockchain can provide a single source of truth for more optimal decision-making, improved customer services, or trusted transactions.

We are seeing strong value in deploying blockchain when financial services and the underlying operations can be significantly accelerated by removing intermediaries: eg, cross-border funds transfer with same-day funds availability – whether for customer payments or book transfers between subsidiaries of the same bank, eKYC for rapid account opening and on-boarding, real-time application of watch list or sanctions updates.

In other cases, for example, mortgage securitization or ESG investments suffer from information asymmetry – the valuations can depend on information that is not available in real-time (eg current mortgage payments or ESG project progress relative to milestones), and when it eventually becomes available, it could have drastic effect on the value of securities. Blockchain can ensure end-to-end information visibility for all concerned parties in near real-time and smart contracts can automate the valuation adjustments based on pre-agreed conditions.

Large banks and financial firms often operate multiple entities across many jurisdictions – making financial accounting and reporting of intercompany transactions a cumbersome process, which blockchain can streamline, as we are seeing in a couple projects. We are also seeing benefits in paper-heavy customer services – trade finance documentation, such as letters of credits or bank guarantees, where using blockchain to anchor secure document sharing, signing, etc. and tracking online documentation processes through trusted transactions on distributed ledgers is a very promising application of enterprise blockchain.



### 1.3.3 How are web3 technologies influencing the enterprise blockchain space?

Innovation in web3 space is very rapid, and while a lot of it is initially consumer focused, we are working hard to bring these capabilities to our enterprise customer base. Tokenization is one example – we've added optimized fungible (FT) and non-fungible token (NFT) support in Oracle Blockchain Platform's implementation of Hyperledger Fabric as we see customers using it in important use cases, e.g., loyalty and rewards programs, micro-payments, and other services based on fungible tokens as well as trade documentation, such as eBills-of-Lading (eBL), intellectual property authentication and licensing using NFTs, and even capitalization of monetizable data as alternative investments. Beyond tokenization, some enterprises are exploring decentralized identity as they operate in complex ecosystems – for example freight shipping carriers, who in turn subcontract deliveries to owners-operators with small truck fleets.

These technologies, like blockchain itself, have significant potential in the enterprise and I believe we'll see greater adoption of tokenization and decentralized identity in a number of new scenarios in coming years. There are also more typical examples, such as media/entertainment customers looking to improve their customer/fan engagement through proprietary NFT marketplaces that don't suffer from some of the problems of open marketplaces.

### 1.3.4 What are Oracle's plans for interoperability between your Hyperledger Fabric blockchain and other DLT technologies?

Interoperability has been our key priority from day one. We have first ensured that our blockchain nodes interoperate with other Hyperledger Fabric vendors (back in 2018 in our first release) – even across multiple clouds, and in fact, have production customers leveraging multi-cloud deployments today. We've also focused on interoperability in terms of smart contract frameworks – in addition to native Hyperledger Fabric smart contracts using Javascript, Java, or Go, we can support DAML smart contracts with DA's Canton-on-Fabric integration, and Solidity smart contracts running in an Ethereum VM (EVM) deployed on Oracle blockchain nodes.

When it comes to cross-ledger integrations, we have certified a partner solution – Overledger from Quant Networks, and are exploring Hyperledger Cactus project, which also provides a strong cross-ledger capability. One of our short-term objectives is to simplify asset exchange for tokens between Oracle blockchain and other ledgers – we believe existing solutions are somewhat complex and not always sufficiently robust for enterprise use, so we have integrated a more robust solution for atomic asset exchange with Ethereum in our orchestration layer.

### 1.3.5 What's next for blockchain in financial services?

A hot area right now is CBDC (Central Bank Digital Currency). Some 105 countries are exploring CBDCs and 10 locations have implemented some form of CBDC. We have been involved in this area for some time, for example, participating in the Bank of England's CBDC Technology Forum, presenting on some privacy and money systems topics to the ECB, and engaging with some central banks around the world on various types of CBDC. This area will spur a lot of financial innovation – both in core digital currency and other financial areas, such as programmable money. Beyond central banks, there are also opportunities for commercial banks to leverage similar solutions for traceable financial products they can offer to their customers.

Another interesting area is embedded finance, which streamlines access to financial services, such as lending, insurance or payment processing in regular business applications – typically ERP systems. This requires banks and other financial institutions to handle transactions through services embedded in their customers' back-office applications. Naturally, this brings up interest in single source of truth between the bank's systems and their customer's ERPs, trusted transactions, immutability and traceability – all areas that benefit from leveraging a blockchain.

### 1.3.6 What does Oracle see as the next big area for blockchain?

I talked about financial services use cases above. Of course, there's also a lot happening in manufacturing, retail, logistics, and related supply chain areas, as well as healthcare, education, and public services. For some regulated goods, authenticated provenance and end-to-end traceability is becoming a necessity. In the automotive industry, many companies are focused on tracing critical minerals used



in manufacturing EV batteries and other components. Sustainable and ethical sourcing use cases are very popular in both industrial and consumer sectors.

In terms of technology, we are seeing decentralized governance as the next big area – when you have a consortium of companies in an enterprise blockchain, many decisions need to be made that blockchain can actually help to operationalize and capture as immutable transactions (eg who gets to join and with what privileges, who has access to particular data or smart contracts, whose approvals are required for updating new versions of smart contracts). We believe that many of these can be implemented via flexible policies with voting by members, which is tabulated and logged on-chain via smart contracts to provide a full audit trail. Today, many of these decisions are handled out-of-band in meetings or via emails and that's not scalable or sufficiently robust for expanding networks and growing applications. We already have some of this in Oracle Blockchain and Hyperledger Fabric, but operationalizing this further via policy-based approach to governance will solve some of the challenges in this area and provide a stronger foundation for these consortiums. It will also enable flexibility on how membership decisions are handled that could blur the line between what today are two very separate worlds of public and permissioned blockchains. In the future, decentralized governance policies can make this adjustable via configurable policy settings – allowing participants to set membership policies and adjust them over time as needed for various use cases.

The other significant area are low-code development tools – bridging the world between general-purpose flexible platforms where you have to write a lot of code to implement a use case, and more rigid, use case-specific blockchains. Our vision is of a flexible, general-purpose enterprise blockchain with low-code tools to configure specific applications from a pre-packaged library of templates and common use cases. Our Blockchain App Builder does this to some extent, for example, for fungible and non-fungible token lifecycles, but more can be done in areas such as asset management, authenticated provenance, notarized document workflows, regulatory compliance, and many more. Plug-in libraries of tailorable use case templates and implementation libraries will make a big difference to how easily and quickly customers can adopt blockchain across the enterprise.



## About Oracle



We're a cloud technology company that provides organizations around the world with computing infrastructure and software to help them innovate, unlock efficiencies and become more effective. We also created the world's first – and only – autonomous database to help organize and secure our customers' data.

Oracle Cloud Infrastructure offers higher performance, security, and cost savings. It is designed so businesses can move workloads easily from on-premises systems to the cloud, and between cloud and on-premises and other clouds. Oracle Cloud applications provide business leaders with modern applications that help them innovate, attain sustainable growth, and become more resilient.

The work we do is not only transforming the world of business – it's helping defend governments, and advance scientific and medical research. From non-profits to companies of all sizes, millions of people use our tools to streamline supply chains, make HR more human, quickly pivot to a new financial plan, and connect data and people around the world.

At work, we embrace diversity, encourage personal and professional growth, and celebrate a global team of passionate people developing innovative technologies that help people and companies tackle real-world problems head-on.

For more information, visit <https://www.oracle.com/>

## About Juniper Research



Juniper Research was founded in 2001 by the industry consultant Tony Crabtree, in the midst of the telecoms and dot-com crash. The business was fully incorporated in February 2002 and has since grown to become one of the leading analyst firms in the mobile and digital tech sector.

Juniper Research specialises in identifying and appraising new high growth market sectors within the digital ecosystem. Market sizing and forecasting are the cornerstones of our offering, together with competitive analysis, strategic assessment and business modelling.

We endeavour to provide independent and impartial analysis of both current and emerging opportunities via a team of dedicated specialists - all knowledgeable, experienced and experts in their field.

Our clients range from mobile operators through to content providers, vendors and financial institutions. Juniper Research's client base spans the globe, with the majority of our clients based in North America, Western Europe and the Far East.